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Approved For Release 2004/03/26 : CIA-RDP78B05703A000200030001-0

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Executive Registry
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NPIC/D-378/70

21 DEC 1970

MEMORANDUM FOR: Executive Director-Comptroller

THROUGH: Chairman, Information Processing Board
DD/I Information Processing Coordinator

SUBJECT: Rental of Additional Core Memory for UNIVAC 494
Systems

REFERENCE: Memorandum from Ex. Dir.-Compt. dated 21 April 1970,
Subject: Approvals Concerning Acquisition of ADP
Equipment and Services

1. This proposal is for the rental of one additional core memory module (of 65,536 words) for each of the two UNIVAC 494 systems presently used by NPIC. The specific request is contained in paragraph 7.

2. The additional core is necessary to provide responses to actions by users of the Integrated Information System (IIS), fast enough to avoid any delay to the analysts that can be ascribed to "having to wait for the computer." Since the IIS and its on-line users will function as an entity in the image analysis process, delays occasioned by "waiting for the computer" are, in fact, lost time that cannot be effectively applied to other productive activities. The net effect of such delays, therefore, would be to reduce the productivity of the imagery analysis operations in relation to the potential productivity with a "wait-less" system.

3. A typical mix of IIS programs core-resident in the IIS computer in prime shift during first phase exploitation would consist of 15 to 17 copies of some six different programs for a total core requirement of 110,000 to 130,000 words (see Attachment for a more detailed breakdown). Since the Operating System requires about 55,000 words, the total core requirement would range from about 165,000 to 185,000 words, well in excess of the present 131,072 word memory. The consequences of this imbalance will vary in a complex manner as a function of divers factors such as the sequence in which the programs were requested by the users, the particular inputs to the various programs, and the interaction

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between various user elements. The end result may range from a mere delay of several minutes of initiating a verification review from a CRT display to a wait of an hour or more for accomplishment of a complex query against the data base. In both situations, there is a direct effect on the production process and a possible indirect effect arising from analyst dissatisfaction.

4. The need to increase the amount of core memory on both machines, rather than just on one, arises from the use of the second central processor as back up for the IIS system in addition to the prime functions of on-line photo-measurement support to the photo interpreters and photogrammetrists, execution of production programs initiated at remote stations, and compilation of FORTRAN and COBOL programs. There is an additional and independent, albeit subsidiary, justification for increasing the amount of core available to this machine. Extension of the on-line measurement system to handle stereo mensuration has almost doubled its core requirement, leaving only 55,000 words of core to provide for open-shop programming and remote batch operation in the Center. The consequence is a marked increase in turn-around time and a severe limitation on the size of programs that can be essayed by open-shop programmers.

5. There is only one alternative that offers a real possibility of avoiding the delays inherent in the IIS under peak loading conditions as previously described. Approximately half of the core requirement at peak loading is taken up by copies of the so-called VEA program, on a basis of one copy for each active CRT display station. An alternative programming approach to support these CRT units would be the development of a single program that can be used by all the CRTs that are on-line at any given time. The time, effort, and complexity of developing a re-entrant VEA program appeared to be a full order of magnitude greater than for the route followed, which was the result of a design decision made in the early stages of the IIS. In retrospect it is clear that we should have followed the re-entrant approach. If we initiate such a program development at this time as an alternative to increasing the amount of available core it would probably take five man-years of effort spread over an 18 month period. In our judgment the Center cannot afford an 18 month overload situation with an on-line system like the IIS.

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6. Because of an anticipated increase in workload we propose to lease the first core module (for use on the "IIS machine") in the fourth quarter of FY 1971; and the second module (for use on the "photo-measurement machine") in the first quarter of FY 1972. Funds in the appropriate fiscal years would be available from NPIC's budget.

7. Request approval to negotiate a contract with [redacted] for the lease of two 65,536-word core modules, one to be installed 1 March 1971 and the second to be installed 1 July 1971, at a cost of approximately [redacted] per month per module, including maintenance.

[redacted]

ARTHUR C. LINDAHL
Director
National Photographic Interpretation Center

Attachment:
Functions & Core Requirements
of Major IIS Program Elements

CONCUR: (Signed) [redacted]
DD/I Information Processing Coordinator

22 DEC 1970
Date

[redacted]
Chairman, Information Processing Board

6 JAN 1971
Date

APPROVED: [redacted]
L. K. WHITE
Executive Director-Comptroller

6 JAN 1971
Date

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SUBJECT: Rental of Additional Core Memory for UNIVAC 494 Systems

Distribution:

Orig - NPIC/ODIP (After Approval)

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- 2 - NPIC/PSG/AID

(NPIC/PSG/AID gm/16 Dec 1970)

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Attachment to NPIC/D-378/70

FUNCTIONS & CORE REQUIREMENTS
OF MAJOR IIS PROGRAM ELEMENTS

1. The core requirements of the function program subsystems (as of 15 September 1970) and their descriptions are listed below. Following this list are typical core for allocation peak and normal IIS computer system activity.

a. The Data Entry Program (DEN) allows the photo interpreter or his representative to enter the target-oriented immediate reports data into an "on-line" reports file. This program requires approximately 6,000 words of memory and is a remote batch type; i.e., the program is loaded via a remote device but its input/output is handled by the operating system as "batch" messages. The program is not interactive but can be core-resident for long or short periods of time depending upon the actual function(s) performed.

b. The Verify, Edit and Approval Program (VEA) allows the mission editors/coordinators to use a CRT to review and change information entered via "DEN" above; verifying, editing and approving it for subsequent publication and data base update. This program requires approximately 7,000 words of memory and is a remote conversational type, i.e., a "copy" of the program resides in memory for each CRT "conversing" with the computer.

c. The Extended File Control Subprogram (EFC) performs all accesses to the sensitive drum based IIS files, preserving the file integrity as well as simplifying file input/output for other IIS application programs. This routine requires approximately 3,000 words of memory and is a non-resident re-entrant type of routine; i.e., core-resident in one copy when needed, yet shared by all IIS programs. It can be considered a subroutine common to all programs, yet using only that core required for one program.

d. The Automated Update Program (AUB) accepts "approved" target data (after VEA process) and uses it to update appropriate targets in the IDP. This program requires approximately 4,000 words of memory and is scheduled automatically by "EFC" when there is data base update action to perform.

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FUNCTIONS & CORE REQUIREMENTS
OF MAJOR IIS PROGRAM ELEMENTS

e. The On-Line program (OUD) allows the data base coordinators to recall data from the file on to a CRT, alter the data, and return it to the data base (via AUD). This program requires approximately 3,500 words of memory and is a remote conversational type.

f. The Batch Query Language Program (BOL) allows IIS file users to query the files in a manner that requires passing large portions of data base, thus requiring processing times prohibitive to the "on-line" language. This program requires approximately 15,500 words of memory and is a remote batch or operator-initiated batch program. Typically, this program (as well as RPG below) will be limited to one or two copies in memory during prime time due to size, core residency time, and volume of input/output activity.

g. The Report Generation Program (RPG) provides the generalized capability for "hard copy" formatting of IIS outputs. This program requires approximately 16,300 words of memory and is a remote batch type. This program, typically, is called automatically by BOL to format the data acquired from a selection process. Subsets of this program exist within the OUD, VEA, and PIRL programs.

h. The PIC Retrieval Language Program (PIRL) allows IIS file users to query the files using concise statements resulting in limited amounts of highly useful data consisting of specific pieces of file information. These data are usually displayed on a device with limited display area. This program requires approximately 18,500 words of memory and is either remote conversational or remote batch.

i. The Presentation Language Program (PLP) provides the capability to define new or altered report formats for use by the RPG program. This program requires approximately 7,000 words of memory and is a remote batch type.

j. The Periodic Update Program (PUD) manages the mass storage for the IIS files. The program redistributes the data stored in file overflow/add areas into a compact and efficient arrangement. The program also purges outdated information from the files. This program requires 32,000 words of memory and is a batch type.

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FUNCTIONS & CORE REQUIREMENTS
OF MAJOR IIS PROGRAM ELEMENTS

2. Since the previous programs are loading and processing in consonance with NPIC's workload and requirements, it is erroneous to simply add the individual program core requirements to arrive at the total IIS system core requirement. Typical "mixes" along with the resulting core requirements are shown below.

a. Peak IIS Activity (during first-phase exploitation; approximately two weeks duration in conjunction with receipt of film).

Program Name	Number, Simultaneously Core-Resident	Memory Requirements (K = thousands of words)
1. VEA	8 (7K each)	56K
2. FURL	2 (18.5K each)	37K
3. BOL/RPG (one or the other)	1	16K
4. EFC	1	3K
5. OUD/AUD (one or the other)	1	4K
6. DEN	2 (6K each)	<u>12K</u>
Total IIS Requirement		128K

b. Normal IIS Activity (typical working day with limited mission exploitation but substantial data base maintenance, interrogation and report generation).

FUNCTIONS & CORE REQUIREMENTS
OF MAJOR IIS PROGRAM ELEMENTS

	Program Name	Number, Simultaneously Core-Resident	Memory Requirements (K = thousands of words)
1.	VEA	3 (7K each)	21.0K
2.	EFC	1	3.0K
3.	BOL	1	15.5K
4.	KPG	1	16.3K
5.	AUD	1	4.0K
6.	ODD	3 (3.5K each)	10.5K
7.	PIRL	2 (18.5K each)	37.0K
8.	DEN	1	6.0K
	Total IIS Requirement		113.3K